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ABSTRACT

The booklet specifies procedures used in Ohio for determining the existence of a severe discrepancy between intellectual ability and achievement in learning disabled (LD) students. An introductory section outlines state regulations regarding eligibility criteria for determining LD. A three-step procedure is then described (and illustrated in a case example) for calculating the discrepancy score. Alternative methods of determining the discrepancy score are noted. Additional sections focus on tests used in the discrepancy formula. (Lists of specific tests are appended for basic reading scores, reading comprehension, mathematics calculation and reasoning, oral expression, listening comprehension, and written expression.) An approach to explaining the LD discrepancy formula to parents is described. (CL)

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LD DISCREPANCY FORMULA: A HANDBOOK

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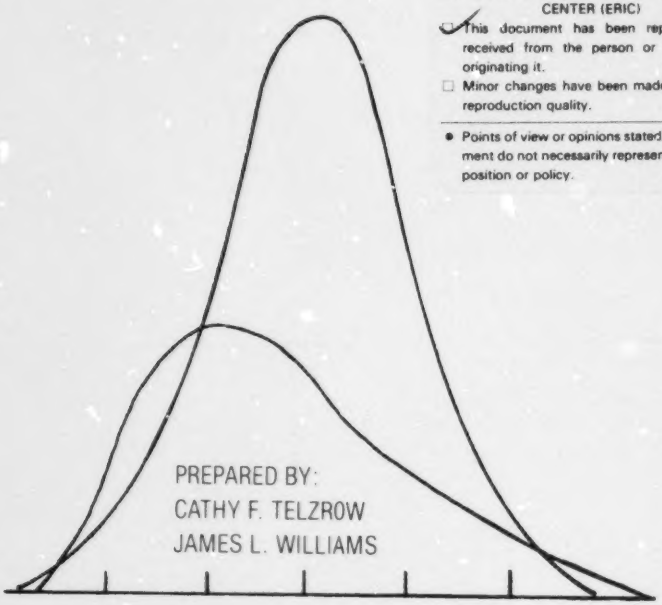

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FOREWORD

The Federal Regulations for evaluating specific learning disabilities have generated a significant discussion of issues throughout Ohio and the Nation. Because of the language in these regulations, districts have had great difficulty in developing appropriate specific criteria. One of the difficult issues is the development of criteria to determine the existence of a severe discrepancy between ability and achievement.

In order to assist school districts in responding to this issue and assure that children with learning disabilities are appropriately identified, the Ohio Rules for the Education of Handicapped Children contain a formula to determine the existence of a severe discrepancy. These rules will enable the districts to comply with the Federal Regulations and will assist them in identifying handicapped children with a learning disability.

This handbook has been prepared by the Cuyahoga SERRC in cooperation with the Ohio School Psychologists' Association, The Ohio Association of Supervisors of Learning Disability Programs, parents of LD children, and staff of the Division of Special Education. The purpose of this handbook is to provide assistance to professionals in understanding and utilizing the severe discrepancy formula and communicating these procedures to parents and other professionals.

I would like to express my appreciation to the individuals involved in the development of this handbook. It is hoped that this handbook will assist those personnel involved in the identification and evaluation of handicapped children suspected as learning disabled.

S.J. Bonham, Jr., Director
Division of Special Education

November 12, 1981

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INTRODUCTION

Two decades since the identification of learning disabilities was first a concern to educators, a precise definition of this condition has yet to be developed (Sabatino and Miller, 1980). There is inconsistency among school districts in both the kinds and numbers of identified L.D. students (Warner, et al., 1980), because a wide range of individual definitions have been employed by school districts in the identification of L.D. children. Eligibility criteria for L.D. services, described in federal regulations developed in accordance with P.L. 94-142, require the existence of a severe discrepancy between intellectual ability and achievement in one or more specific areas. This discrepancy, however, cannot be primarily the result of a) a visual, hearing, or motor handicap; b) mental retardation; c) emotional disturbance; or d) environmental, cultural or economic disadvantage.

A specific procedure for determining the existence of a severe discrepancy between intellectual ability and achievement had not been specified at either the federal or state level in the past. Consequently, methods for making this determination have varied widely across public school districts in Ohio. The use of a formula to derive a discrepancy score is contained in the Ohio Rules for the Education of Handicapped Children. This method is an attempt to remedy the inconsistency among school districts in L.D. services eligibility by providing a concrete and universal method for determining whether a severe discrepancy exists between intellectual ability and achievement.

This Handbook explains the L.D. Discrepancy Formula in detail and provides case illustrations to demonstrate how the calculations are made. Alternative methods for calculating the discrepancy score are discussed, and cut off tables for specific combinations of test instruments are provided. Listings of test instruments reported by test developers to be appropriate for the seven areas listed in the federal regulations are provided. A procedure for communicating the results of the discrepancy score calculation to parents is provided.

ELIGIBILITY CRITERIA FOR SPECIFIC LEARNING DISABILITIES

The eligibility criteria for determining the existence of specific learning disabilities, as contained in the Ohio Rules for the Education of Handicapped Children are as follows:

3301-51-04 SPECIAL EDUCATION PROGRAMS FOR HANDICAPPED CHILDREN

(G) PROGRAM FOR SPECIFIC LEARNING DISABLED CHILDREN

(1) ELIGIBILITY

A CHILD WHO MEETS THE DEFINITION FOR SPECIFIC LEARNING DISABILITY ACCORDING TO PARAGRAPH (FFF) OF RULE 3301-51-01 OF THE ADMINISTRATIVE CODE AND THE FOLLOWING REQUIREMENTS SHALL BE ELIGIBLE FOR SPECIAL EDUCATION PROGRAMMING AND RELATED SERVICES FOR SPECIFIC LEARNING DISABLED CHILDREN.

(a) EACH CHILD SHALL HAVE A MULTIFACTORED EVALUATION FOR INITIAL PLACEMENT THAT INCLUDES, BUT IS NOT NECESSARILY LIMITED TO, EVALUATIONS IN THE FOLLOWING AREAS:

(i) GENERAL INTELLIGENCE AS DETERMINED THROUGH A MEASURE OF COGNITIVE FUNCTIONING ADMINISTERED BY A QUALIFIED PSYCHOLOGIST USING A TEST DESIGNED FOR INDIVIDUAL ADMINISTRATION;

(ii) ACADEMIC PERFORMANCE AS MEASURED THROUGH THE USE OF STANDARDIZED TESTS DESIGNED FOR INDIVIDUAL ADMINISTRATION WHICH MUST INCLUDE EVALUATION IN THE AREAS OF:

(a) BASIC READING SKILLS,
(b) READING COMPREHENSION,
(c) MATHEMATICS CALCULATION, AND
(d) MATHEMATICS REASONING:

(iii) VISION, HEARING, AND MOTOR ABILITIES;

(iv) COMMUNICATIVE STATUS, WHICH MUST INCLUDE ASSESSMENTS IN THE AREAS OF:

(a) ORAL EXPRESSION,
(b) LISTENING COMPREHENSION, AND
(c) WRITTEN EXPRESSION; AND

(v) SOCIAL AND EMOTIONAL STATUS.

(b) EACH CHILD SHALL HAVE A SEVERE DISCREPANCY BETWEEN ACHIEVEMENT AND ABILITY WHICH ADVERSELY AFFECTS HIS OR HER EDUCATIONAL PERFORMANCE TO SUCH A DEGREE THAT SPECIAL EDUCATION AND RELATED SERVICES ARE REQUIRED: THE BASIS FOR MAKING THE DETERMINATION SHALL BE:

(i) EVIDENCE OF A DISCREPANCY SCORE OF TWO OR GREATER THAN TWO BETWEEN INTELLECTUAL ABILITY AND ACHIEVEMENT IN ONE OR MORE OF THE FOLLOWING SEVEN AREAS:

(a) ORAL EXPRESSION,
(b) LISTENING COMPREHENSION,
(c) WRITTEN EXPRESSION,
(d) BASIC READING SKILLS,
(e) READING COMPREHENSION,
(f) MATHEMATICS CALCULATION, OR
(g) MATHEMATICS REASONING.

(ii) THE FOLLOWING FORMULA SHALL BE USED IN COMPUTING THE DISCREPANCY SCORE:

(a) FROM:

(i) THE SCORE OBTAINED FOR THE MEASURE OF INTELLECTUAL ABILITY,

(ii) MINUS THE MEAN OF THE MEASURE OF INTELLECTUAL ABILITY,

(iii) DIVIDED BY THE STANDARD DEVIATION OF THE MEASURE OF INTELLECTUAL ABILITY;

(b) SUBTRACT:
   (i) SCORE OBTAINED FOR THE MEASURE OF ACHIEVEMENT,
   (ii) MINUS THE MEAN OF THE MEASURE OF ACHIEVEMENT,
   (iii) DIVIDED BY THE STANDARD DEVIATION OF THE MEASURE OF ACHIEVEMENT.

(c) THE RESULT OF THIS COMPUTATION EQUALS THE DISCREPANCY SCORE. IF THE DISCREPANCY SCORE IS TWO OR GREATER THAN TWO, A SEVERE DISCREPANCY EXISTS.

CALCULATION OF DISCREPANCY SCORE

To illustrate the calculation of the discrepancy score*, as just quoted in the Ohio Rules for the Education of Handicapped Children:

Step 1: Find the total of the following calculation:

a. Take the score obtained for the measure of intellectual ability

b. subtract the mean (average) score of the measure of intellectual ability, and

c. divide by the standard deviation of the measure of intellectual ability

$$\frac{\text{IQ score} - \text{Mean of IQ test}}{\text{Standard deviation of IQ test}} = \text{IQ deviation score}$$

Step 2: Find the total of the following calculation:

a. Take the score obtained for the measure of achievement

b. subtract the mean of the measure of achievement, and

c. divide by the standard deviation of the measure of achievement

$$\frac{\text{Achievement Score} - \text{Mean of Achievement Test}}{\text{Standard Deviation of Achievement Test}} = \text{Achievement Deviation Score}$$

*See Note 1, References

Step 3: Subtract the total found in Step 2 from the total found in Step 1.

The remainder of this computation equals the discrepancy score between intellectual ability and achievement.

	—		=	
IQ Deviation Score		Achievement Deviation Score		Discrepancy Score

If this discrepancy score is +2.00 or greater, this constitutes a severe discrepancy between intellectual ability and achievement.*

Case Application of L.D. Discrepancy Formula

Intelligence test score = 97
Mean of intelligence test = 100
Standard deviation of intelligence test = 15
Achievement test score = 27
Mean of achievement test = 50
Standard deviation of achievement test = 10

Step 1. Find the total of following calculation:

a. Take the score obtained for the measure of intellectual ability (97)
b. subtract the mean of the measure of intellectual ability (100) and
c. divide by the standard deviation of the measure of intellectual ability (15)

97	—	100		
IQ Score		Mean of IQ Score		
			=	-.20
				IQ Deviation Score

15
Standard Deviation of IQ Test

* See Note 1, References

Step 2: Find the total of the following calculation:

a. Take the score obtained for the measure of achievement (27)

b. subtract the mean of the measure of achievement (50), and

c. divide by the standard deviation of the measure of achievement (10)

27	—	50		
Achievement Score		Mean of achievement test		
			=	-2.30
				Achievement deviation score
10				
Standard deviation of achievement test				

Step 3: Subtract the total found in Step 2 from the total found in Step 1

-.20	—	-2.30	=	+2.10*
IQ deviation score		Achievement deviation score		discrepancy score

In the example the remainder (+2.10) indicates that a severe discrepancy between intellectual ability and achievement is demonstrated. If a discrepancy score of two or greater is revealed by application of the discrepancy formula the evaluation team must determine that the cause for the discrepancy is not one of those listed as disqualifying the child from learning disabilities services (visual, motor, or hearing handicaps, emotional disturbance, mental retardation, environmental, cultural, or economic disadvantage). The evaluation team must agree that such a discrepancy represents an adverse effect on the child's educational performance and that achievement is not commensurate with age and ability levels when there is evidence that the child has been provided learning experiences appropriate for his/her age and ability levels.

*two minuses convert to a plus

Alternative Methods of Determining Discrepancy Scores

In addition to this method of calculating the discrepancy score, other procedures may be more appropriate and/or more efficient, depending upon the statistical properties of the test instruments. Appendix A includes descriptions of alternative methods for determining the presence of a severe discrepancy between intellectual ability and achievement.

Specific Learning Disability With Discrepancy Score Below Two

The Ohio Rules for the Education of Handicapped Children allow for the determination of a specific learning disability, even though the calculation of the discrepancy formula results in a discrepancy score of less than two. The Rules state:

3301-51-04 SPECIAL EDUCATION PROGRAMS FOR HANDICAPPED CHILDREN

(G) PROGRAM FOR SPECIFIC LEARNING DISABLED CHILDREN

(1) Eligibility

(e) IN THE EVENT THAT THE EVALUATION TEAM DETERMINES THAT A CHILD HAS A SPECIFIC LEARNING DISABILITY, EVEN THOUGH THE APPLICATION OF THE FORMULA FOR COMPUTING THE DISCREPANCY SCORE INDICATES THAT THE CHILD DOES NOT HAVE A DISCREPANCY SCORE OF TWO OR GREATER THAN TWO BETWEEN ACHIEVEMENT AND ABILITY, THE TEAM JUDGMENT MUST PREVAIL. IN THIS EVENT, THE TEAM MUST DOCUMENT IN THE WRITTEN REPORT THE FOLLOWING ADDITIONAL INFORMATION:

(i) DATA OBTAINED IN THE EVALUATION OF THE SEVEN AREAS OF EDUCATIONAL FUNCTIONING LISTED IN PARAGRAPH (G) (1) (b) (i) OF THIS RULE;

(ii) RECOMMENDATIONS AND INFORMATION OBTAINED FROM THE CHILD'S REGULAR CLASSROOM TEACHERS AND PARENT;

(iii) EVIDENCE OF THE CHILD'S PERFORMANCE IN THE REGULAR CLASSROOM INCLUDING WORK SAMPLES AND GROUP TEST SCORES;

(iv) EVIDENCE OF POSSIBLE DEFICIENCIES IN MORE THAN ONE OF THE SEVEN AREAS OF EDUCATIONAL FUNCTIONING;

(v) ADDITIONAL SUPPORTIVE DATA BESIDES STANDARDIZED TEST DATA; AND

(vi) CONSIDERATION OF THE CHILD'S AGE, PARTICULARLY IN THE CASE OF YOUNG CHILDREN.

As written, the Ohio Rules for the Education of Handicapped Children neither require a discrepancy score of two or greater for L.D. services nor mandate L.D. services because a severe discrepancy is demonstrated. Eligibility for a learning disabilities program is determined by the evaluation team, based on several factors, including the presence of a severe discrepancy between intellectual ability and achievement. If the application of the formula does not demonstrate a discrepancy score of two or above, the evaluation team may determine that a child has a specific learning disability, and document evidence to support this decision, as outlined in the Ohio Rules for the Education of Handicapped Children, cited above.

TESTS FOR USE IN L.D. DISCREPANCY FORMULA

To calculate a discrepancy score in these four areas - basic reading skills, reading comprehension, mathematics calculation, and mathematics reasoning - the Ohio Rules for the Education of Handicapped Children indicate that standardized tests designed for individual administration must be used. Tables 1-4 in Appendix B provide lists of instruments which the test developers have indicated are appropriate for these specific achievement areas. Each table has been divided into two sections, one including tests which report means and standard deviations, and thus can be used in the calculation of the discrepancy score using the discrepancy formula, and a second section comprised of criterion referenced instruments or those tests which do not report means and standard deviations. Instruments of this type may be useful to members of the evaluation team in supporting the decision that a specific learning disability exists although not demonstrated by a discrepancy score of two or greater, and/or in developing the IEP. Reliability scores reported by test publishers are also cited for the instruments listed. Diagnosticians are referred to *Standards for Educational and Psychological Tests* (APA, 1974) for further guidelines regarding selection of appropriate test instruments.

The Ohio Rules for the Education of Handicapped Children indicate that assessment of the remaining three areas of achievement - oral expression, listening comprehension, and written expression - must be included. If standardized instruments are available which measure these areas, such a procedure is preferred. If the evaluation team asserts that the use of such devices is inappropriate, alternative assessment techniques may be employed. Tables 5, 6, and 7 contain lists of instruments which test developers have indicated are appropriate to evaluate oral expression, listening comprehension, and written expression.

EXPLAINING THE L.D. DISCREPANCY FORMULA TO PARENTS

Evaluation team members, especially school psychologists, L.D. supervisors, and teachers, may frequently need to explain the application of the L.D. discrepancy formula to parents, teachers, and others unfamiliar with this concept.

Appendix C includes a simplified explanation of the concepts involved in the L.D. Discrepancy Formula which school personnel can remove, duplicate, and disseminate to parents, if desired. While the explanation does not incorporate all theoretical and statistical ramifications of the formula (e.g., standard error of measurement, sample composition of selected tests, etc.), it incorporates the most salient features of the process and may help parents understand the concepts involved. It is suggested that the form included with the explanation in Appendix C be utilized during the IEP Conference. The child's actual scores can be inserted in the appropriate boxes to illustrate how the discrepancy score is derived.

APPENDIX A

Alternative Methods for Calculating Discrepancy Scores

1. Simplified, Subtraction Method

When the intelligence test and the achievement test both have the same *mean* and *standard deviation,* it is possible to determine whether or not a severe discrepancy between intellectual ability and achievement exists by subtracting the score obtained on the achievement test from the score obtained on the intelligence test. If the resulting number is equal to or greater than twice the standard deviation of the two tests, this indicates there is a severe discrepancy between intellectual ability and achievement. To illustrate, consider a case where:

intelligence test score = 107
achievement test score = 96
mean of both tests = 100
standard deviation of both tests = 15

The discrepancy can be obtained by subtracting the achievement score from the intelligence score:

107	—	96	= 11
Score obtained on intelligence test		Score obtained on achievement test	

With a common standard deviation of 15, a remainder of 30 or greater must be obtained to constitute a severe discrepancy. Therefore, in this case the remainder (11) does not represent a severe discrepancy between intellectual ability and achievement.

2. Cut-off tables

Several tests of intellectual functioning have a mean of 100 and a standard deviation of 16. Examples of tests of this nature are:

a. Stanford-Binet Intelligence Scale
b. Hiskey-Nebraska
c. McCarthy Scales of Children's Abilities

When using an intelligence test with a mean of 100 and a standard deviation of 16 in conjunction with an achievement test with a mean of 100 and a standard deviation of 15, a table using cut-off scores can be used. To use this table (Table a), locate the intelligence test score obtained by the subject in the appropriate column; next read across to the corresponding achievement test cut-off score. If the achievement score obtained by the subject is equal to or below the achievement test cut-off score listed on the table, a severe discrepancy exists. To illustrate, consider a case where:

The obtained intelligence test score = 86
The obtained achievement test score = 50
The cut-off score = 56

By locating the obtained intelligence test score (86) in the IQ score column and reading across to the achievement test cut-off score, we identify 56 as that cut-off score. The obtained achievement test score is less than the cut-off (56); thus a severe discrepancy exists between intellectual ability and achievement.

In addition to Table a, developed for this specific combination of tests, other cut-off tables have been developed for the following test combinations:

1. IQ test with mean of 100 and standard deviation of 16, and achievement test with mean of 50 and standard deviation of 10 (Table b)
2. IQ test with mean of 100 and standard deviation of 15, and achievement test with mean of 50 and standard deviation of 10 (Table c)

3. Use of z-score formula

A z-score is a way of expressing an obtained score in standard deviations from the mean. A z-score of -.5 indicates that the obtained score is one-half of one standard deviation below the mean, or about 92 on an intelligence test like the Wechsler or Binet (see figure below)

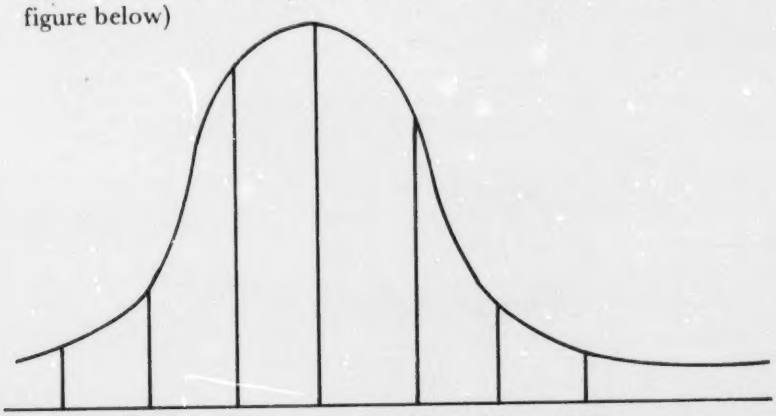


ILLUSTRATION OF DISTRIBUTION OF STANDARD DEVIATIONS, WECHSLER IQ TEST SCORES, AND Z-SCORES.

A z-score can be calculated for any test once the *mean* and *standard deviation* are known, by inserting the obtained score in the following formula.

$$z = \frac{x - \bar{x}}{\sigma}$$

where

z = the z-score, or discrepancy from the mean
x = obtained score
$\bar{x}$ = mean of test
σ = standard deviation of test

To illustrate, assume a child scores IQ 92 on a WISC-R, which has a mean of 100 and a standard deviation of 15:

$x = 92$
$\bar{x} = 100$
$\sigma = 15$

$$z = \frac{x - \bar{x}}{\sigma}$$

$$z = \frac{92 - 100}{15}$$

$$z = \frac{-8}{15}$$

$$z = -.53$$

The discrepancy formula in the Ohio Rules for the Education of Handicapped Children calculates z-scores for both the intelligence test and the achievement test scores and obtains a discrepancy measure by subtracting the achievement z-score from the intelligence test z-score. This process determines whether or not the *difference* in z-scores is significant in light of the child's own ability. Ohio's formula, as described in the Ohio Rules for the Education of Handicapped Children, suggests that a discrepancy score of +2.00 between the two z-scores is indicative of a severe discrepancy.

The entire formula is illustrated in the following 3-step procedure:

(1) $Zx = \frac{Xx - \overline{X}x}{\sigma x}$

where
Zx = z-score of intelligence measure
Xx = obtained IQ score
$\overline{X}x$ = IQ test mean
σx = IQ test standard deviation

(2) $Zy = \frac{Xy - \overline{X}y}{\sigma y}$

where
Zy = z-score of achievement measure
Xy = obtained achievement test score
$\overline{X}y$ = achievement test mean
σy = achievement test standard deviation

(3) $D = Zx - Zy$

where
D = discrepancy score
Zx = z-score for intelligence measure
Zy = z-score for achievement measure

Case Application

WISC-R obtained score = 98
Woodcock Reading = 36

(1) $Zx = \frac{Xx - \overline{X}x}{\sigma x}$

$Zx = \frac{98 - 100}{15}$

$Zx = -.13$

(2) $Zy = \frac{Xy - \overline{X}y}{\sigma y}$

$Zy = \frac{36 - 50}{10}$

$Zy = -1.4$

(3) $D = Zx - Zy$

$D = -.13 - (-1.4)$

$D = +1.27$

The discrepancy score (+1.27) does not comply with the definition of a severe discrepancy between intellectual ability and achievement, which is specified as +2.00 or greater in the Ohio Rules for the Education of Handicapped Children.

Table a

Achievement Test Cut-Off Scores for use with IQ tests with mean of 100, standard deviation of 16 and achievement tests with mean of 100 and standard deviation of 15. If the obtained achievement test score is equal to or less than the cut-off score for the obtained IQ score, a severe discrepancy exists.

I.Q. $\bar{X}$ = 100 SD = 16	Achievement test cut off score $\bar{X}$ = 100 SD = 15	I.Q. $\bar{X}$ = 100 SD = 16	Achievement test cut off score $\bar{X}$=100 SD=15
130	98	99	69
129	97	98	68
128	96	97	67
127	95	96	66
126	94	95	65
125	93	94	64
124	92	93	63
123	91	92	62
122	90	91	61
121	89	90	60
119	87	89	59
118	87	88	58
117	86	87	57
116	85	86	56
115	84	85	55
114	83	84	55
113	82	83	54
112	81	82	53
111	80	81	52
110	79	80	51
109	78	79	50
108	77	78	49
107	76	77	48
106	75	76	47
105	74	75	46
104	73	74	45
103	72	73	44
102	71	72	43
101	70	71	42
100	70	70	41

Table b

Achievement Test Cut-Off scores for use with IQ tests with mean of 100 and standard deviation of 16, and achievement tests with mean of 50 and standard deviation of 10. If the obtained achievement test score is equal to or less than the cut-off score for the obtained IQ score, a severe discrepancy exists.

I.Q. $\bar{X}$ = 100 SD = 16	Achievement test cut off score $\bar{X}$ = 50 SD = 10	I.Q. $\bar{X}$ = 100 SD = 16	Achievement test cut off score $\bar{X}$ = 50 SD = 10
130	48	99	29
129	48	98	28
128	47	97	28
127	46	96	27
126	46	95	26
125	45	94	26
124	45	93	25
123	44	92	25
122	43	91	24
121	43	90	23
120	42	89	23
119	41	88	22
118	41	87	21
117	40	86	21
116	40	85	20
115	39	84	20
114	38	83	19
113	38	82	18
112	37	81	18
111	36	80	17
110	36	79	16
109	35	78	16
108	35	77	15
107	34	76	15
106	33	75	14
105	33	74	13
104	32	73	13
103	31	72	12
102	31	71	11
101	30	70	11
100	30		

Table c

Achievement test cut-off scores for use with IQ tests with mean of 100 and standard deviation of 15, and achievement tests with mean of 50 and standard deviation of 10. If the obtained achievement test score is equal to or less than the cut-off score for the obtained IQ score, a severe discrepancy exists.

I.Q. $\bar{X} = 100$ SD = 15	Achievement test cut off score $\bar{X} = 50$ SD = 10	I.Q. $\bar{X} = 100$ SD = 15	Achievement test cut off score $\bar{X} = 50$ SD=10
130	50	99	29
129	49	98	28
128	48	97	28
127	48	96	27
126	47	95	26
125	46	94	26
124	46	93	25
123	45	92	24
122	44	91	24
121	44	90	23
120	43	89	22
119	42	88	22
118	42	87	21
117	41	86	20
116	40	85	20
115	40	84	19
114	39	83	18
113	38	82	18
112	38	81	17
111	37	80	16
110	36	79	16
109	36	78	15
108	35	77	14
107	34	76	14
106	34	75	13
105	33	74	12
104	32	73	11
103	32	72	11
102	31	71	10
101	30	70	9
100	30		

APPENDIX B

Tests for Use in Evaluation of Children for Specific Learning Disabilities

Table 1. Basic Reading Skills - Tests which report means and standard deviations

Title	Author	Publisher	Age/Grade	Mean	SD	Reliability Coefficient
Peabody Individual Achievement Test	Dunn & Markwardt	American Guid. Service	Grades K-12	100	15***	.89*
Wide Range Achievement Test	Jastak, Jastak, & Bijou	Guidance Assoc.	Ages 5-adult	100	15	.98*
Woodcock-Johnson Psychoeducational Battery	Woodcock & Johnson	Teaching Resources	Ages 3-adult	100 or 50	15*** 10	.92–.95*
Basic School Skills Inventory	Goodman & Hammill	Edmark	Ages 5-7	50	10***	.50–.93*
Woodcock Reading Mastery Test	Woodcock	American Guid. Service	Grades K-12	50	10***	.96*

Table 1. Basic Reading Skills - Tests which do not report means and standard deviations

Title	Author	Publisher	Age/Grade	Reliability Coefficient
Assessment of Basic Competencies	Somwaru	Scholastic Testing Services, Incorporated	3-15	.82-.91*
Brigance Diagnostic Inventory of Basic Skills	Brigance	Curriculum Associates	Grades K-6	**
Brigance Diagnostic Inventory of Early Development	Brigance	Curriculum Associates	Ages 0-7	**
Brigance Diagnostic Inventory of Essential Skills	Brigance	Curriculum Associates	Grades 7-12	**
Botel Reading Inventory	Botel	Follett Publishing Company	Grades K-12	.94-.99*
Diagnostic Reading Scales	Spache	CTB/McGraw-Hill	Grades 1-7	**

continued

*Test-retest or split half reliabilities reported in test manual
**No reliability information reported in test manual
***Reports standard scores derived from normal curve equivalents

Table 1 (continued)

Title	Author	Publisher	Age/Grade	Reliability Coefficient
Durrell Analysis of Reading Difficulties	Durrell & Catterson	Psych. Corp.	Grades 1-9	.80-.85*
Durrell Listening Reading Series	Durrell	Psych. Corp.	Grades 1-9	.96*
Gilmore Oral Reading Test	Gilmore & Gilmore	Harcourt, Brace & World	Grades 1-8	.51-.94*
Gray Oral Reading Test	Gray	Bobbs-Merrill	Grades 1-12	**
Psychoeducational Battery	Pope	Book-Lab, Inc.	Grades K-12	**
Woodcock Language Proficiency Battery	Woodcock	Teaching Resources	Ages 3-adult	**

Table 2. Reading Comprehension - Tests which report means and standard deviations

Title	Author	Publisher	Age/Grade	Mean	SD	Reliability Coefficient
Peabody Individual Achievement Test	Dunn & Markwardt	American Guid. Service	Grades K-12	100	15***	.64*
Test of Adolescent Language	Hammill, Brown, Larsen, Wiederholt	B.L. Winch & Associates	Grades 7-12	10	3	.91*
Test of Reading Comprehension	Brown, Hammill, Wiederholt	B.L. Winch & Associates	Grades 1-12	100	15	.69-.91*
Woodcock Johnson Psychoeducational Battery	Woodcock Johnson	Teaching Resources	Ages 3-Adult	100 or 50	15*** 10	.86*
Woodcock Reading Mastery Test	Woodcock	American Guid.	Grades K-12	50	10***	.90-.96*
Gates-MacGinite Reading Tests	Gates & MacGinite	Riverside Publishing Company	Grades 1-9	50	10	.88-.96*

*Test-retest or split-half reliability coefficients reported in test manual
**No reliability information reported in test manual
***Reports standard scores derived from normal curve equivalent

Table 2. Reading Comprehension - Tests which do not report means and standard deviations

Title	Author	Publisher	Age/Grade	Reliability Coefficient
Assessment of Basic Competencies	Somwaru	Scholastic Testing Services, Inc.	3-15	.82-.81*
Brigance Diagnostic Inventory of Basic Skills	Brigance	Curriculum Associates	Grades K-6	**
Brigance Diagnostic Inventory of Essential Skills	Brigance	Curriculum Associates	Grades 7-12	**
Botel Reading Inventory	Botel	Follett Publishing	Grades K-12	.94-.99*
Diagnostic Reading Scales	Spache	CTB/McGraw-Hill	Grades 1-7	**
Durrell Analysis of Reading Difficulty	Durrell & Catterson	Psych. Corporation	Grades 1-9	.80 .85*
Durrell Listening Reading Series	Durrell	Psych. Corporation	Grades 1-9	.88*
Gilmore Oral Reading Test	Gilmore-Gilmore	Harcourt-Brace, Jovanovich	Grades 1-8	.86*
Gray Oral Reading Test	Gray	Bobbs-Merrill	Grades 1-12	**
Psychoeducational Battery	Pope	Book-Lab., Inc.	Ages 4-12	**
Woodcock Language Proficiency Battery	Woodcock	Teaching Resources	Ages 3-adult	**

Table 3. Mathematics Calculation - Tests which report means and standard deviations

Title	Author	Publisher	Age/Grade	Mean	SD	Reliability Coefficient
Peabody Individual Achievement Test	Dunn & Markwardt	American Guid. Services	Grades K-12	100	15***	.74*
Wide Range Achievement Test	Jastak, Jastak, Bijou	Guidance Associates	Ages 5-adult	100	15	.94*
The Woodcock-Johnson Psychoeducational Battery	Woodcock, Johnson	Teaching Res.	Ages 3-adult	100 or 50	15*** 10	.89*

*Test-retest or split-half reliability coefficients reported in test manual
**No reliability information reported in test manual
***Reports standard scores derived from normal curve equivalent

Table 3: Mathematics Calculation - Tests which do not report means and standard deviations

Title	Author	Publisher	Age/Grade	Reliability Coefficient
Assessment of Basic Competencies	Somwaru	Scholastic Testing Services, Incorporated	3-15 Grades pre-K-9	.75-.87*
Brigance Diagnostic Inventory of Basic Skills	Brigance	Curriculum Associates	Grades K-6	**
Brigance Diagnostic Inventory of Essential Skills	Brigance	Curriculum Associates	Grades 1-12	**
Key Math Diagnostic Arithmetic Test	Connally, Nachtman, Pritchett	American Guidance Service, Incorporated	Grades K-12	96*
Psychoeducational Battery	Pope	Book-Lab., Inc.	Grades K-12	**

Table 4. Mathematics Reasoning - Tests which report means and standard deviations

Title	Author	Publisher	Age/Grade	Mean	SD	Reliability Coefficient
Basic School Skills Inventory	Goodman & Hammill	Edmark	Ages 5-7	50	10***	.50-.93*
Peabody Individual Achievement Test (PIAT)	Dunn & Markwardt	American Guid.	Grades K-12	100	15***	.74*
Woodcock-Johnson Psychoeducational Battery	Woodcock, Johnson	Teaching Resources	Ages 3-adult	100 or 50	15*** 10	.85*

*Test-retest or split-half reliability coefficients reported in test manual
**No reliability information reported in test manual
***Reports standard scores derived from normal curve equivalent

Table 4. Mathematics Reasoning - Tests which do not report means and standard deviations

Title	Author	Publisher	Age/Grade	Reliability Coefficient
Assessment of Basic Competencies	Somwaru	Scholastic Testing Service	Grades pre K-9 Ages 3-15	.75-.87*
Brigance Diagnostic Inventory of Basic Skills	Brigance	Curriculum Associates	Grades K-6	**
Brigance Diagnostic Inventory of Essential Skills	Brigance	Curriculum Associates	Grades 7-12	**
Key Math Diagnostic Arithmetic Test	Connally, Nachtman Pritchett	American Guidance Service, Inc.	Grades K-12	.96*
Kraner Preschool Math Inventory	Kraner	Learning Concepts	Grades K-12	**
Psychoeducational Battery	Pope	Book-Lab., Inc.	Grades K-12	**

Table 5. Oral Expression - Tests which report means and standard deviations

Title	Author	Publisher	Age/Grade	Mean	SD	Reliability Coefficient
Basic School Skills Inventory	Goodman & Hammill	Ed.mark	Ages 5-7	50	10***	.50-.93*
Test of Adolescent Language (TOAL)	Hammill, Brown, Larsen Wiederholt	B.L. Winch and Assoc.	Grades 7-12	10	3	.85-.92*
Test of Language Development (TOLD)	Newcomer and Hammill	B.L. Winch and Associates	Grades Pre K-3 Ages 4-9	10	3	.86-.99*

*Test-retest or split half reliabilities reported in test manual
**No reliability information reported in test manual
***Reports standard scores derived from normal curve equivalents

Table 5. Oral Expression - Tests which do not report means and standard deviations

Title	Author	Publisher		Reliability Coefficient
Assessment of Basic Competencies	Somwaru	Scholastic Testing Service	Ages 3-15	.76-.81*
Brigance Diagnostic Inventory of Early Development	Brigance	Curriculum Associates	Ages Birth-7	**
Brigance Diagnostic Inventory of Essential Skills	Brigance	Curriculum Associates	Grades 7-12	**
Clinical Evaluation of Language Functions (CELF) (Screening and Diagnostic)	Wiig & Semel	Charles E. Merrill	K-12	.89*
Woodcock Language Proficiency Battery	Woodcock	Teaching Resources	Ages 3-adult	**

Table 6. Listening Comprehension - Tests which report means and standard deviations

Title	Author	Publisher	Age/Grade	Mean	SD	Reliability Coefficient
(TOAL)Test of Adolescent Language	Hammill, Brown, Larsen and Wiederholt	B.L. Winch and Associates	Grades 7-12	10	3	.82*
The Token Test for Children	DiSimoni	Teaching Resources	Ages 4-12	500	5	**

Table 6. Listening Comprehension - Tests which do not report means and standard deviations

Title	Author	Publisher	Age/Grade	Reliability Coefficient
Assessment of Basic Competencies	Somwaru	Scholastic Testing Service	Ages 3-15	.76 - .81*
Assessment of Children's Language Comprehension	Roster, Stark, Giddan	Consulting Psy. Press	Ages 3-6½	**
Brigance Diagnostic Inventory of Early Development	Brigance	Curriculum Associates	Ages birth-7	**

*Test-retest or split-half reliability coefficients reported in test manual
**No reliability information reported in test manual

continued

Clinical Evaluation of Language Functions (CELF) (Screening & Diagnostic)	Wiig & Semel	Charles E. Merrill	Grades K-12	.93*
Detroit Tests of Learning Aptitude	Baker & Leland	Bobbs-Merrill	Ages 3-19	.96*
Durrell Analyses of Reading Difficulties	Durrell & Catterson	Psychological Corp.	Grades 1-9	.79*
Durrell Listening - Reading Series (DLRS)	Durrell	Psychological Corp.	Grades 1-9	.79 - .94*
Tests for Auditory Comprehension of Language (TACL)	Carrow-Woolfolk	Teaching Resources	Ages 3-6	.94*

Table 7. Written Expression - Tests that report means and standard deviations

Title	Author	Publisher	Age/Grade	Mean	SD	Reliability Coefficent*
Test of Adolescent Language (TOAL)	Hammill, Brown, Larsen and Wiederholt	B.L. Winch and Associates	Grades 7-12	10	3	.98*
TOWL - Test of Written Language	Hammill and Larsen	B.L. Winch and Associates	Grades 1-8	100	15	.75 - .92*

Table 7. Written Expression - Tests that do not report means and standard deviations

Title	Author	Publisher	Age/Grade	Reliability Coefficient
Myklebust Picture Story Language Test (PSLT)	Myklebust	Grune & Stratton	Ages 7-17	.38 - .92*
Test of Written English	Anderson, Thompson	Academic Therapy Pub.	Grades 1-6	**
Woodcock Language Proficiency Battery	Woodcock	Teaching Resources	Ages 3-adult	**

*Test-retest or split-half reliability coefficients reported in test manual
**No reliability information reported in test manual

APPENDIX C

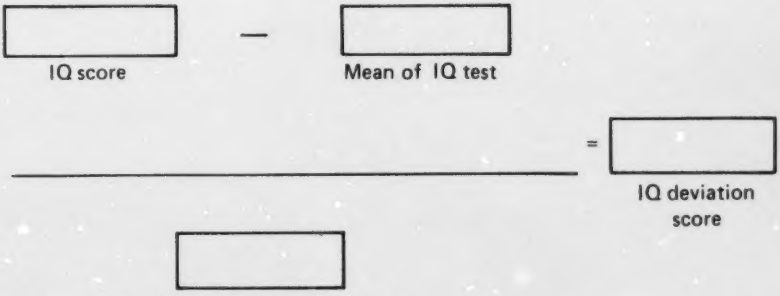
Explaining the L.D. Discrepancy Formula to Parents*

Intelligence tests and achievement tests used to calculate a discrepancy score were "standardized" by giving them to large groups of students. The standard score a child obtains on an intelligence test permits us to compare his/her performance with the performance of the large group of students on whom the test was standardized. The same is true of an achievement test: the standard score obtained on an achievement test provides a way of comparing that student's performance with the large group of students on which the achievement test was standardized.

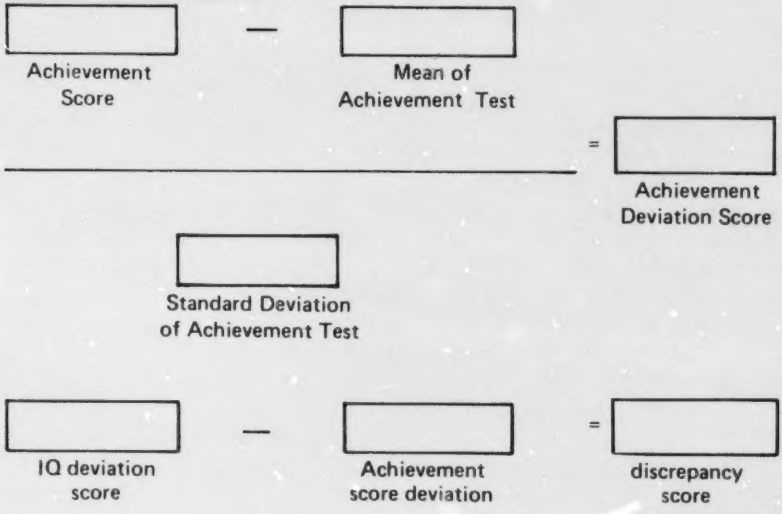
A "severe discrepancy" occurs when the student's score on the intelligence test is higher than his/her score on the achievement test by some specified amount. A discrepancy score that is equal to or greater than two (+2.00) has been specified in the Ohio Rules for the Education of Handicapped Children as reflecting a severe discrepancy between intellectual ability and achievement.

It is possible to calculate a discrepancy score by using the child's intelligence test score and achievement test score in a mathematical equation. This equation is shown on the attached page. If the child's discrepancy score is equal to or greater than two (+2.00), we can say there is a severe discrepancy between intellectual ability and achievement.

The following format may be used:



*See Note 1, References



If the discrepancy score is equal to or greater than two (+2.00), the student is said to have a severe discrepancy between intellectual ability and achievement.

APPENDIX D

References and Notes

Reference Note

When calculating a "discrepancy score" school psychologists and educators must exercise caution. Consideration should be given to the possibility that the reliability of the discrepancy score may be lower than the individual reliability of either the intelligence test score or the achievement test score alone. When calculating discrepancy scores, four factors need to be considered; 1) the reliability of the intelligence test; 2) the reliability of the achievement test; 3) the correlation between the intelligence and achievement test; 4) the differences in the norm groups of the two tests. The reliability of a discrepancy score is equal to the average reliability of the intelligence and achievement tests minus the correlation between the two tests, divided by 1 minus the correlation between the two tests. It is suggested that calculation of the reliability of the discrepancy score is especially important when the reliability of one or both of the tests is relatively low, and/or the two tests are highly correlated. It should be noted that when the reliability of a discrepancy score is low, a decision about the child's eligibility for L.D. services based on the discrepancy score is more likely to be due to chance.

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NOTES